

## REMARKS

The Examiner's Office Action of October 22, 2002 has been received and its contents reviewed. Applicant would like to thank the Examiner for the consideration given to the above-identified application.

By the above actions, claims 1-3 have been amended. Accordingly, claims 1-8 are pending for consideration, of which claims 1, 4, 6 and 8 are independent. In view of these actions and the following remarks, reconsideration of this application is now requested.

Referring now to the detailed Office Action, Claims 1-8 stand rejected under 35 U.S.C. §102(b) as anticipated by either one of Hwang (U.S. Patent No. 6,063,529) or Ando et al. (U.S. Patent No. 5,989,759 – hereafter Ando). This rejection is respectfully traversed at least for the reasons provided below.

Hwang discloses an overlay accuracy measurement mark used in measuring an overlay accuracy between any two selected device patterns. Specifically, tetragonal overlaying marks (i.e., through holes) are formed in the layers forming each mask pattern. The invention of Hwang measures the deviation between each mask pattern, as illustrated in Fig. 4. Further, although the overlay patterns, which are to be measured, are formed in the mask pattern and are tetragonal, the size of the patterns are different, as disclosed in, e.g., claim 1, line 9 of Hwang.

Ando discloses an invention relating to a lithography system of mix and match method using multiple types of exposing devices during the forming of a single layer mask pattern. Specifically, only light exposure is performed on the surface of the substrate on which a film of photosensitive material is formed, and thereby forming a latent image of the pattern in the photosensitive material. Next, the latent image is exposed for pattern alignment, and development is performed after the forming of the mask pattern, as disclosed in paragraph 7, lines 53-65, and paragraph 4, line 63 to paragraph 6, line 13 in Ando.

According to the present invention, by forming the alignment mark having an equal size to the circuit pattern, the deviation between the alignment mark and the circuit pattern can be

prevented, and the accuracy of the alignment of the lower layer in the circuit pattern can be improved. Hence, amended claim 1 recites the second on-mask alignment mark having a size equal to that of the second on-wafer intended pattern. Original independent claim 4 recites a second on-mask alignment accuracy measuring mark having a size equal to that of a second on-mask intended pattern is formed on a layer-to-be-aligned-defining photomask. Original independent claim 6 recites the on-mask alignment mark having a size equal to that of a second on-wafer intended pattern to be defined in a layer-to-be-aligned. Previously amended independent claim 8 recites the on-mask alignment mark having a size equal to that of a second on-wafer intended pattern to be defined in a layer-to-be-aligned

The presently claimed invention provides a solution for a problem that is now summarized as follows:

When accurately aligning a layer (hereafter A layer) composed of the first on-wafer intended pattern (i.e., pattern of insulating film for separating devices) and the first on-wafer alignment mark, and a layer (hereafter B layer) composed of the second on-wafer intended pattern (e.g., gate electrode pattern) and the second on-wafer alignment mark, the deviation between the A layer and the B layer is measured by the first on-wafer alignment mark of the A layer and the second on-wafer alignment mark of the B layer. In the case where the width of the line of the second on-wafer alignment mark and that of the second on-wafer intended pattern of the B layer is different, differences in the deviation of the alignment marks and the deviation of the intended patterns occur. This is because the width of the line of the alignment mark and that of the intended pattern are designed with different sizes, and hence differences occur due to the differences in the way exposing lights are reflected.

To solve the above problem, the present invention prevents the deviations by forming the alignment mark and the intended pattern in equal size, as recited in the pending independent claims.

As discussed above, in Hwang, the mark is formed in each layer of mask pattern, and is used to measure the deviations among the layers. In order to accurately measure these deviations, the mark formed in each layer is tetragonal and different in sizes.

However, the present invention relates to the alignment masks formed in the same layer and used for aligning, and the prevention of differences in alignment due to the diffraction of light between the circuit patterns (hereafter intended patterns) used for forming the semiconductor device. According, in the presently claimed invention, in order to prevent the differences, the diffraction of light is being kept the same by setting the sizes of the alignment marks and the intended patterns equal. Applicant respectfully submits that Hwang does not disclose this claimed feature.

As summarized above, Ando relates to performing exposure on multiple types of exposing devices having the same photosensitive material, and forming a single layer mask pattern. Subsequently, the latent image of the pattern formed within the photosensitive material during exposure is detected and the pattern is aligned with the reference, and thereafter the next exposure is performed.

However, according to the present invention, exposure is performed on each layer, and the mask pattern formed by developing is used to align with the pattern being patterned. Moreover, the present invention relates to the alignment masks formed in the same layer and used for aligning, and the prevention of differences in alignment due to the diffraction of light between the circuit patterns (hereafter intended patterns) used for forming the semiconductor device. Accordingly, in the presently claimed invention, in order to prevent the differences, the diffraction of light is being kept the same by setting the sizes of the alignment marks and the intended patterns equal. Applicant respectfully submits that Endo does not disclose this claimed feature.

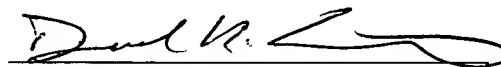
Consequently, since each and every feature of the present claims is not taught (and is not inherent) in the teachings of Hwang or Endo, as is required by MPEP Chapter 2131 in order to

establish anticipation, the rejection of claims 1-8, under 35 U.S.C. §102(b), as anticipated by Hwang or Endo is improper.

In view of the amendments and arguments set forth above, Applicant respectfully requests reconsideration and withdrawal of all the pending rejections.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicant's representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,



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